

Hybrid Servo Motors

Stepper Motors with Encoders, 0.9 Nm to 8.0 Nm



Descriptions

Leadshine hybrid servo motors, or stepping motors with encoders, are designed to work with Leadshine hybrid servo drives including HBS57, HBS86, and HBS86H. They are currently available in frame size NEMA 23 with holding torque of 0.9, 1.0, or 2.0 Nm, and NEMA 34 with holding torque of 4.0 or 8.0 Nm. All those hybrid servo motors are integrated with 1,000-line) optical incremental encoders.

Encoder Specifications

Parameter	Min	Typical	Max	Unit
Operating Temperature	-40	-	100	°C
Supply Voltage	4.5	5	5.5	VDC
Output Current per Channel	-1	-	5	mA
Low Level Output Voltage	-	-	0.4	VDC
High Level Output Voltage	2.4	-	-	VDC
Count Frequency	-	-	100	KHz

Motor Specifications

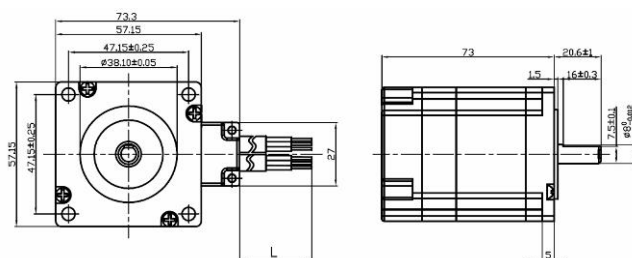
Model	Phase	Step Angle (Degree)	Leads	Holding Torque (N.m)	Phase Current (A)	Phase Resistance (Ohm)	Phase Inductance (mH)	Rotor Inertia (g.cm ²)	Weight (Kg)	Encoder (lines)
573S09-EC	3	1.2°	3	0.9	5.8	0.35	0.72	280	0.75	1000
573S20-EC	3	1.2°	3	2.0	5.8	0.62	1.85	580	1.3	1000
57HS10-EC	2	1.8°	4	1.0	4.2	0.4	2.0	200	0.8	1000
57HS20-EC	2	1.8°	4	2.0	5.8	0.37	2.0	480	1.25	1000
86HS40-EC	2	1.8°	4	4.0	5.5	0.46	4.0	1500	1.5	1000
86HS80-EC	2	1.8°	4	8.0	6.0	0.44	3.73	2580	3.8	1000

The image displays three separate wiring diagrams for different motor models, each showing a central motor symbol with four leads connected to it.

- Top Diagram (573S09-EC, 573S20-EC):** The motor symbol is a circle with an 'M' inside. It has four leads: U / Brown (top-left), V / BLU (top-right), W / BLK (bottom), and a fourth lead (bottom-left) which is not labeled with a letter but has a dot. The leads are connected to a common point in the center of the motor symbol.
- Middle Diagram (57HS10-EC, 57HS20-EC):** The motor symbol is a circle with '4 LEADS' inside. It has four leads: A+ / BLK (top-left), A- / RED (top-right), B+ / YEL (bottom-left), and B- / GRN (bottom-right). The leads are connected to a common point in the center of the motor symbol.
- Bottom Diagram (86HS40-EC, 86HS80-EC):** The motor symbol is a circle with '4 LEADS' inside. It has four leads: A+ / BLK (top-left), A- / RED (top-right), B+ / YEL (bottom-left), and B- / BLU (bottom-right). The leads are connected to a common point in the center of the motor symbol.

Model	Motor Cables			Encoder Cables		
	Standard	Extension		Standard	Extension	
	Length	Length	Part Number	Length	Length	Part Number
573S09-EC	0.55±0.02m	*	*	0.55±0.02m	3m	CABLE-ENCODER-03
					5m	CABLE-ENCODER-05
573S20-EC	0.55±0.02m	*	*	0.55±0.02m	3m	CABLE-ENCODER-03
					5m	CABLE-ENCODER-05
57HS10-EC	0.80±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0*
					8m	CABLEH-BM8M0*
57HS20-EC	0.80±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0*
					8m	CABLEH-BM8M0*
86HS40-EC	0.52±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0*
					8m	CABLEH-BM8M0*
86HS80-EC	0.52±0.02m	*	*	0.30±0.02m	3m	CABLEH-BM3M0*
					8m	CABLEH-BM8M0*

Mechanical Specifications – with Encoder



L	57S09-EC		57HS10-EC	
	Motor Cable	Encoder Cable	Motor Cable	Encoder Cable
	550±20mm	550±20mm	800±20mm	300±20mm

Note: Shaft Diameter 6.35mm optional.

Figure 1: Mechanical Specification of 573S09-EC and 57HS10-EC

Mechanical Specifications – with Encoder (Continued)

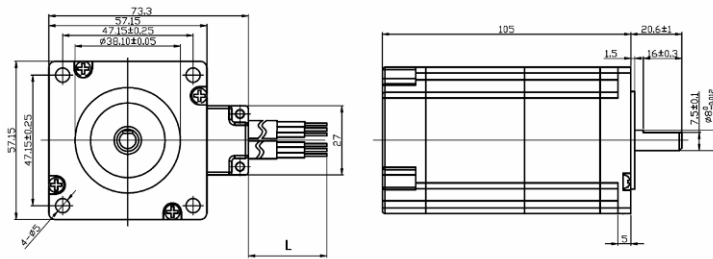


Figure 2: Mechanical Specification of 573S20-EC

L	573S20-EC	
	Motor Cable	Encoder Cable
	550±20mm	550±20mm

Note: Shaft Diameter 6.35mm optional.

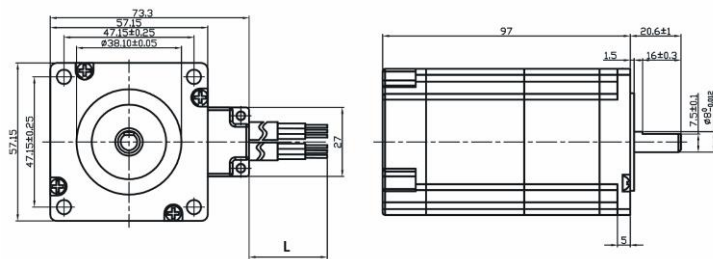


Figure 3: Mechanical Specification of 57HS20-EC

L	57HS20-EC	
	Motor Cable	Encoder Cable
	800±20mm	300±20mm

Note: Shaft Diameter 6.35mm optional.

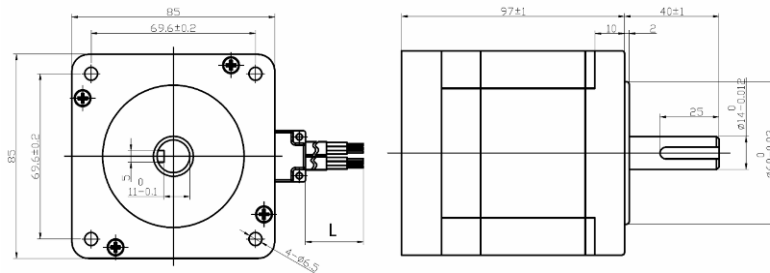


Figure 4: Mechanical Specification of 86HS40-EC

L	86HS40-EC	
	Motor Cable	Encoder Cable
	520±20mm	300±20mm

Note: Shaft Diameter 12.7mm optional.

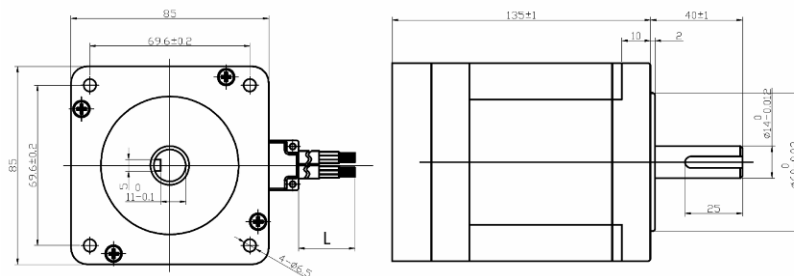


Figure 5: Mechanical Specification of 86HS80-EC

L	86HS80-EC	
	Motor Cable	Encoder Cable
	520±20mm	300±20mm

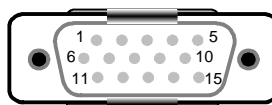
Encoder Extension Cable Pin Out

(Note: only for CABLEH-BM3M0 and CABLEH-BM8M0)

Pin	Color	Name	Description	Pin	Color	Name	Description
1	Red	VCC	+5V power input	4	Green	B-	Encoder Channel B-
2	White	GND	+5V GND	5	Black	A+	Encoder Channel A+
3	Yellow	B+	Encoder Channel B+	6	Blue	A-	Encoder Channel A-

Encoder Connector

Encoder Connector – HDD15 Male



573S09-EC, 573S20-EC,

Pin	Name	Color	I/O	Description
1	EA+	Black	O	Encoder channel A+ output
2	EB+	Yellow	O	Encoder channel B+ output
3	GND	White	GND	Ground
4	NC	-	-	Not Connected
5	NC	-	-	Not Connected
6	NC	-	-	Not Connected
7	NC	-	-	Not Connected
8	NC	-	-	Not Connected
9	NC	-	-	Not Connected
10	NC	-	-	Not Connected
11	EA-	Blue	O	Encoder channel A- output
12	EB-	Green	O	Encoder channel B- output
13	VCC	Red	I	+5V power input
14	NC	-	-	Not Connected
15	NC	-	-	Not Connected

57HS10-EC, 57HS20-EC, 86HS40-EC, 86HS80-EC

Pin	Name	Color	I/O	Description
1	EA+	Black	O	Encoder channel A+ output
2	VCC	Red	I	+5V power input
3	GND	White	GND	Ground
4	NC	-	-	Not Connected
5	NC	-	-	Not Connected
6	NC	-	-	Not Connected
7	NC	-	-	Not Connected
8	NC	-	-	Not Connected
9	NC	-	-	Not Connected
10	NC	-	-	Not Connected
11	EB+	Yellow	O	Encoder channel B+ output
12	EB-	Green	O	Encoder channel B- output
13	EA-	Blue	O	Encoder channel A- output
14	NC	-	-	Not Connected
15	NC	-	-	Not Connected

Speed-Torque Curves

Note: These curves are based on 40% holding torque percentage of HBS57. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

573S09-EC

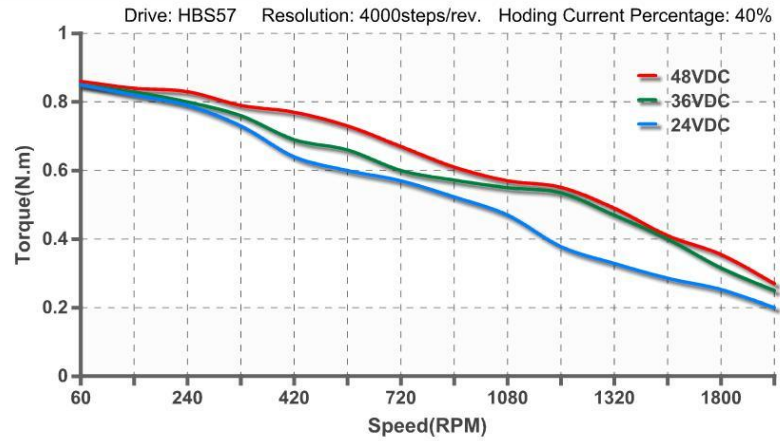


Figure 6: Speed Torque Curve of 573S09-EC and HBS57

Note: These curves are based on 40% holding torque percentage of HBS57. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

573S20-EC

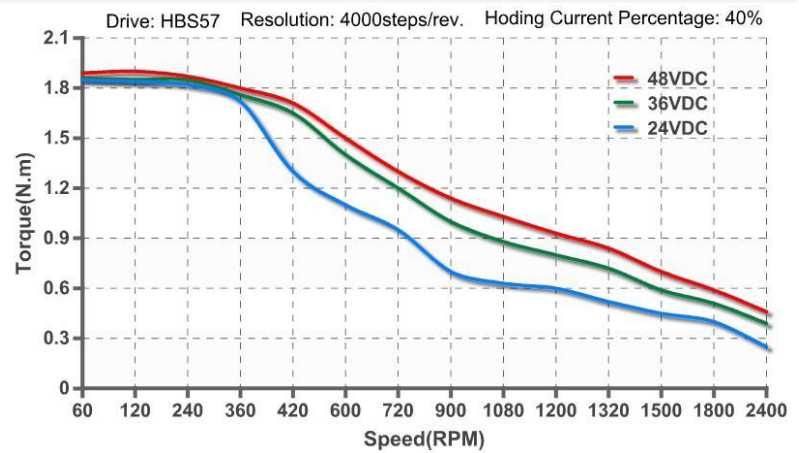


Figure 7: Speed Torque Curve of 573S20-EC and HBS57

Note: These curves are based on 40% holding torque percentage of HBS86. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

86HS40-EC

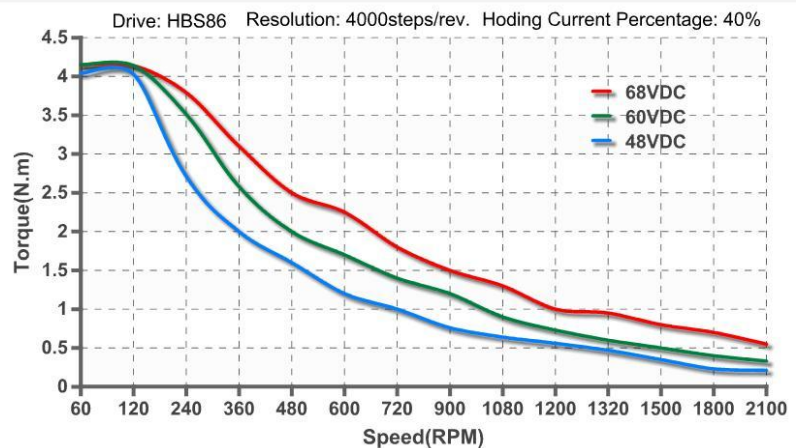


Figure 8: Speed Torque Curve of 86HS40-EC and HBS86

Speed-Torque Curves (Continued)

86HS80-EC

Note: These curves are based on 40% holding torque percentage of HBS86. If higher torque at high speed is required, you can change the holding torque percentage to 100%. See software manual.

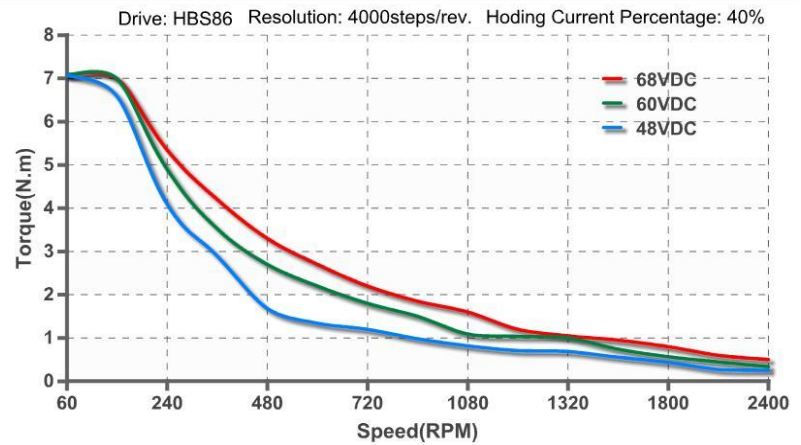


Figure 9: Speed Torque Curve of 86HS80-EC and HBS86